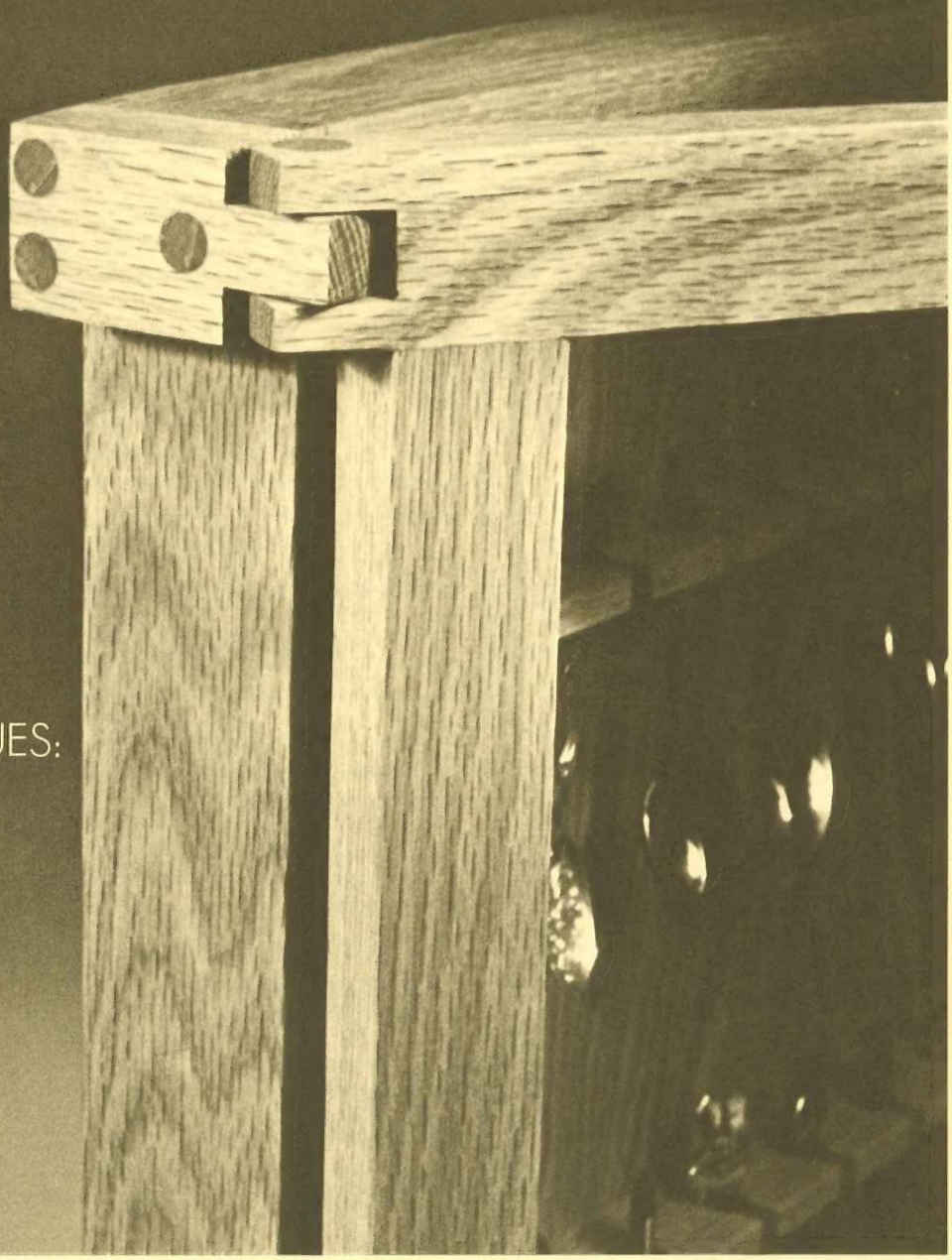
NUMBER NINE NOTES FROM THE SHOP

Woodsmith™

SPECIAL: WOODEN HINGES



FIVE PROJECTS WITH WOODEN HINGES . . .

DISPLAY CASE
LAP DESK
SWEATER CHEST
JEWELRY BOX
LIGHT BRACKET

PLUS . . .

JOINERY TECHNIQUES:
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Woodsmith™

Number Nine May, 1980

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Talking Shop

ABOUT THIS ISSUE

As I was making the initial sketches for the projects in this issue, I was a little hesitant. To be honest with you, I didn't know if this idea of wooden hinges was going to work. And, to make things worse, I wanted to come up with several different kinds of hinges — different applications of hinging with wood.

To my knowledge, there's almost no information on wooden hinges. So, it was a matter of trial and error (with a lot of errors). As I was building some rough mock-ups of the hinges, I would grab the nearest dowel handy to use as a hinge pin to test the function of the hinge.

This led to the discovery that a pin (dowel) smaller than the hole works much better than one exactly the same size as the hole. Granted, this discovery isn't up there with sliced bread or Monday Night Football, but it did solve some problems.

First, the smaller pin allows the hinge to work smoothly . . . without binding or squeaking. Second, unlike metal hinges, you need to allow a little extra space for expansion during humid weather. And third, when the pin is smaller than the hole, there's enough leeway in the action of the hinge so clearance is not so terribly critical.

Once these problems were solved, it opened up a lot of possibilities for application of wooden hinges to "ordinary" projects. That's what I've tried to do in this issue: Take "ordinary" projects and make them a little special with wooden hinges.

CHANGE OF ADDRESS

We've moved. Not far, we're still in good old Des Moines. But for the past two years I've been working out of my home. I finally decided to make the big move and rent some space.

Now I have a real office (instead of a corner of a spare bedroom), enough space for an enlarged shop (instead of a corner of the basement), and a place for a photo studio (instead of the dining room).

All of this means two things for you. If you want to write to us, use the new address: Woodsmith Publishing Co., 1912 Grand Ave., Des Moines, Iowa 50309. We'll still get all mail sent to the old address (and the old P.O. Box) for the rest of this year.

Since we moved, I've been in the process of building an entirely new shop. There will be new workbenches, storage, stands, etc. — all of which will be appearing in future issues.

I also want to build some things for the office and reception area: new desks, tables, chairs, maybe a couch, and several other things that would be appropriate for use in a home.

Space was always a major problem in the past. But now I have enough room to build some of these larger projects (that many of you have requested).

NOTES AND THOUGHTS

This is the first issue with tips and techniques sent in by readers (next page). If you have any ideas for this page, don't hold back. Send them in.

One of the most difficult things about woodworking is access to information. In fact, woodworking has been called "the lonely sport." Each of us spends time in our own shop without much chance to discuss or exchange ideas, tips, or techniques. I hope the Tips & Techniques page will be an open forum for this kind of information.

• *PROBLEMS* Most of the time things run fairly smoothly around here. But in the past few months the number of subscriptions has increased dramatically (we're up to about 8,000 now), and of course the problems — and errors on our part — have also increased.

If there's anything wrong with your subscription, or with back issues you've ordered, or anything else, feel free to use the envelope enclosed in this issue to tell us. (There's no need for any postage, we pay at this end.)

You're the boss. Tell us what the problem is, and what we should do to correct it.

• *ERRORS* There's an error in the drawing for the rabbet/tongue joint shown in *Woodsmith* No. Six. When making the second cut (in the front piece) it reads: Face Toward Spacing Block. This implies the outside face. But it should read: *Inside* Face Toward Spacing Block.

Also, there's an official error in the drawing for the unofficial *Woodsmith* binder, *Woodsmith* No. Seven. The width of the cover should be 8½" (not 12" as shown), and the length of the spine should be 12" (not 8½" as shown). These two dimensions got switched.

•*QUESTIONS* I'd like to start printing questions sent in by readers (at least those I can answer). If I don't know the answer, we'll throw it up for grabs, and maybe someone out there can enlighten the rest of us.

NEXT MAILING: July 1, 1980.

Tips & Techniques

SEALING END GRAIN

When applying oil stain to raw (sanded) wood, one usually coats the end grain with linseed oil to prevent the end grain from "sucking" up too much of the stain. Agreed. However, if you plan to put a lacquer finish (*Deft*) on your project you should not use an oil stain — the stain tends to move under the lacquer.

One solution is to use a water-based stain. But I think *Deft* vinyl stain is much better. (It doesn't raise the grain as much.) Do not stir the can of vinyl stain. Rather, apply the liquid that has separated at the top of the can to the end grain.

Then stir the can of stain thoroughly and apply the *Deft* stain to all areas. The liquid will prevent the stain from penetrating deeply into the end grain.

By following this procedure, there's no fear of having an incompatible base (of stain or sealer) beneath the top coats of *Deft* lacquer.

Lester R. Bernstein
Monsey, New York

GLUE CLEAN-UP

When I clean up after using glue (I use hide glue for most projects) I use a cloth saturated in vinegar. This seems to do a great job . . . providing the glue is still wet.

Your suggestion to wait until the glue dries (*T & T, No. 7*) doesn't seem to work for me.

George Keates
Huntington Station, New York

You bring up a good point. No matter how I do it, the best way is the way that works best for you.

SLIPPERY ROUTER SOLVED

I read about the problem you were having with the *Sears* router in the Talking Shop column in Issue Number Six. I used to have the same problem with my Sears router (No. 315.25070, 1 HP).

I've owned this router about seven years and not only does the router bit slip out of the collet when I don't want it to, but I have a hard time removing the bit when I do want it to come out.

About a year ago I picked up an old *Sears* router at a garage sale. At first I thought it was just like my first one. But then I noticed the collet was different. The collet went into the collet nut about ¼" and was fastened with a retaining ring. Also, the slot on the collet is a hair wider. I've found this assembly holds much better than the "new" one.

The part numbers for this collet assembly (which fits either router) are: Retaining Ring, 623772-02; Collet Nut, 606489-04; Collet, 606490-02. I hope this is of help to you and your readers.

Clayton A. Chase
Danielson, Conn.

ROUTER TABLE TOP

When I made my router table, I used a section of laminated counter top. (Small "scrap" lengths are usually available at lumber yards.) I cut a slot in the top to accept the miter gauge from my *Sears* table saw — ½" wide, ⅜" deep.

To cut the slot, I clamped a straight board onto the top and used the router with a ½" straight bit. The slot runs at a right angle to the front.

My miter gauge is equipped with a hold-down clamp. With this arrangement the ends of boards can be routed, for example, to form a tenon. I have also used the *Sears* tenon jig to hold boards in a vertical position to cut twin tenons on the router table.

Roger Ziegler
Jefferson, Wisconsin

MUSTARD GLUE?

I use a mustard bottle to apply glue. I bought a plastic bottle of *French's* mustard. After using it, I noticed two small holes in the side of the nozzle which make it ideal for gluing dowel holes (as well as flat boards).

The mustard bottle I bought came with two caps: one for capping the bottle, and a larger one for filling it up from a gallon bottle of glue.

Joseph Adamoski
Gary, Indiana

A STICKY QUESTION

I would like to see a question and answer page in *Woodsmith*. To start it off maybe you could answer this one.

I buy my glue by the gallon (it's much cheaper that way). Do you know the length of time glue can be stored before it loses its bonding strength?

Joseph Adamoski
Gary, Indiana

To be honest with you I don't know the shelf-life of glue with regard to bonding strength. But I'm writing some glue manufacturers for their answer.

I can offer one suggestion, however, for storing glue in gallon containers. Turn the gallon bottle of glue up-side down. (You may have to build a small platform to keep it from tipping.) This way the glue on the "bottom" will "skin over" first, leaving fresh glue at the top for immediate use.

A SPECIAL BIT

I have had several requests to make small, wall-hung shelves for people. The problem is they don't want to mount the shelf to the wall with a bracket (it detracts from the appearance of the shelf and whatever is placed thereon).

I saw a shelf in a shop that had a hole in the back specifically for wall mounting. The hole was large at the bottom and closed slightly at the top. Do you know where I can purchase a bit to form such a hole?

James E. Doughtie
Nashville, North Carolina

The bit that produces that keyhole-shaped hole (usually seen in the back of picture frames) is a Picture Frame Router Bit. The bit is run straight into the frame, then toward the top of the frame (or shelf) until a lip is formed. The lip accepts the head of a nail or screw for hanging.

This type of bit is available from the Woodcraft Supply Catalog, 313 Montvale Avenue, Woburn, Mass. 01888. (Stock No. for the bit is 35B63-AS, $11.90ppd.) Cost of catalog: $1.00

SEND IN YOUR IDEAS

We invite you to share your woodworking tips and techniques with other readers of *Woodsmith*. We will pay a minimum of $10 for a tip, and $15 or more for a special technique. All material submitted becomes the property of Woodsmith Publishing Co. Upon payment, you give *Woodsmith* the right to use the material in any manner for as long as we wish.

If your idea involves a drawing or photo to explain it, do your best and, if necessary, we'll make a new drawing, or build the project or jig and photograph it. (Any drawings or photos submitted cannot be returned.)

Send your ideas to: *Woodsmith*, Tips & Techniques, 2200 Grand Ave., Des Moines, Iowa 50312.

Adjustable Light Bracket

IT SWIVELS ON WOOD

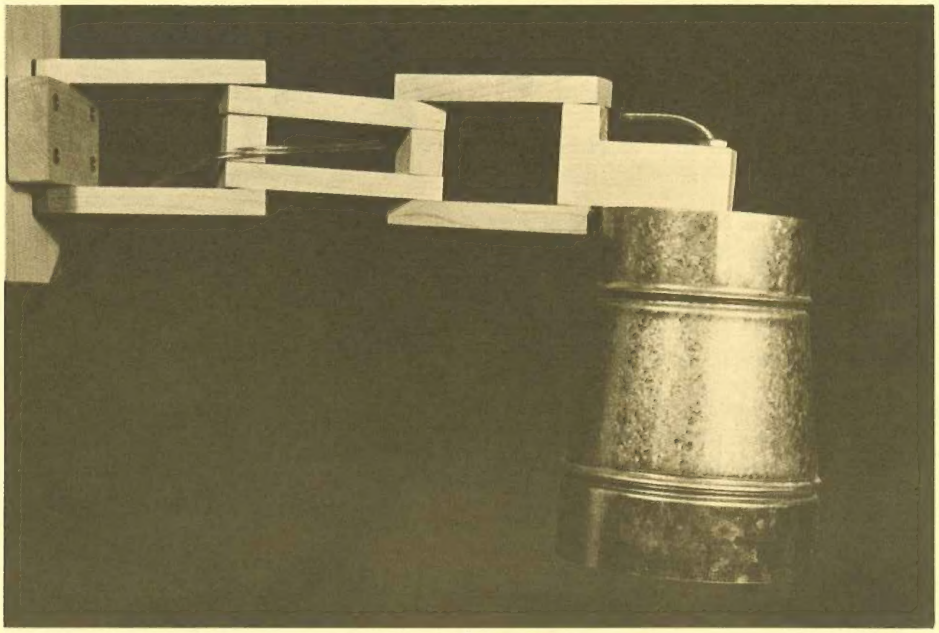
Okay, don't laugh at my lamp shade. I thought it was pretty clever. Besides, I only use this adjustable light bracket in my shop. It's hanging above my band saw, and moves around so I can see where I'm cutting.

Drilling the holes in the arms and the spacers is more accurate (and consistent) if a simple jig is made for the drill press, Fig. 1. The jig consists of a fence and a stop block. As shown in the drawing I placed the stop block about ¼" from the fence. This allows an escape route for the shavings so they don't get trapped in the corner.

Cut the arms and the spacers to size. (Dimensions for this bracket are given in the Materials List but the length of the arms can be varied to suit your needs.) A ½" counterbore is drilled at both ends of all of the outside arms (A), Fig. 2. Then, with the jig in the same position, switch to a ⅜" bit and drill through each of the outside arms, the inside arms, and the spacers. (I used woodbits from the *Leichtung* Catalog.)

Assembly gets a bit tricky. First make the ½" dowel "nuts" by drilling a 5/16" hole down the center of a short piece of ½" dowel. Then cut off little sections (I call them "donuts"). Glue a donut to one end of a 5/16" dowel pin. Then apply glue to the outside rim of the donut and glue it into the counterbore in the top outside arm, Detail A. When the glue is dry, sand the donut and the dowel pin flush with the arm.

Now, slide the inside arms, the spacer, and the bottom outside arm over the 5/16" pin. Apply glue to both the inside and outside rim of a donut and slide it over the dowel pin. This assembly must be clamped tight, but the clamp can only be on the donuts . . . not on the pin. When the glue is dry you can cut and sand off any excess sticking out from the bottom.



Back to my fancy lamp shade. It's a 4" x 5" furnace duct reducer. It's held to the bracket on a round plate (E) that has some ½" vent holes drilled in it, Figure 2. (This plate can be made from scrap ½" or ¾" plywood.)

An L-shaped arm (D) extends from the bracket to support the plate (E) and shade. All of this is held together by running a 2½" x 1/8 IP threaded lamp pipe from the socket, through the plate and the bracket (D), and is secured with a nut. (Information of wiring the socket can be found in the *Reader's Digest Complete Do-It-Yourself Manual.*)

The other end the light bracket is attached to a mounting plate (F). This plate is in turn mounted to a 1 x 4 which, in my case, is attached to a joist in the ceiling over my band saw.

MATERIALS LIST

A	Outside Arm	½ x ¾ - 4½
B	Inside Arm	½ x ¾ - 4½
C	Spacer	¾ x ¾ - 1
D	L-Bracket	¾ x 2 - 3½
E	Shade Plate	¾ x 4 - 4
F	Mounting Plate	¾ x 2 - 3½
	4" x 5 " Furnace Pipe Reducer	
	Socket with Pull Chain	
	2½ " x 1/8 IP Lamp Pipe	
	Lamp Pipe Nut	
	Lamp Cord and Plug	
	5/16" and ½ " Dowels	

CUTTING DIAGRAM

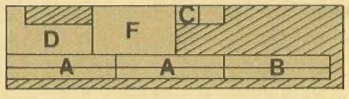


FIGURE 1

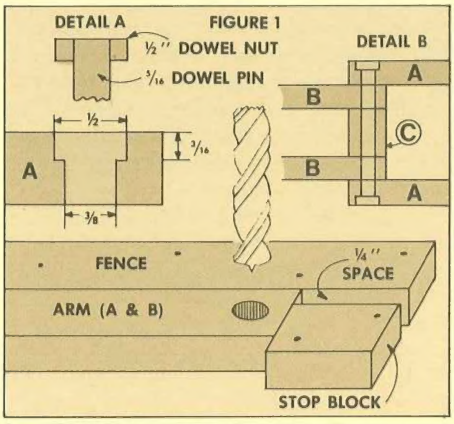


FIGURE 2

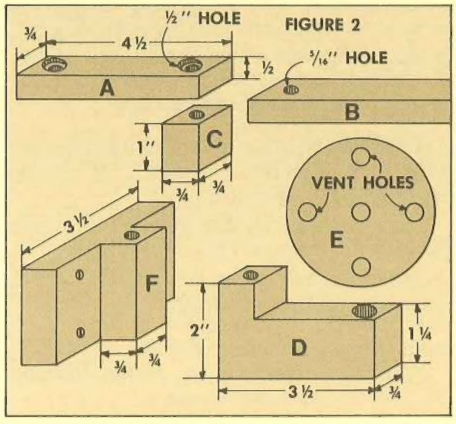
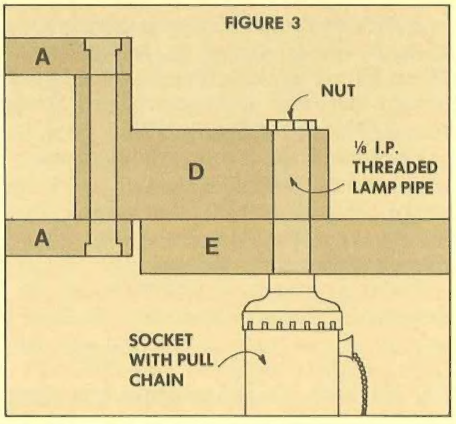


FIGURE 3



Jewelry Box

THE LID HINGES ON WOODEN GUSSETS

You used to see a lot of small jewelry boxes like this. They were inexpensive and invariably had a "Made in Japan" label on the bottom.

The difficulty with small boxes like this is finding a hinge small enough for the thin wood used. One solution was to use a metal "gusset" as a hinge. Naturally, I tried to make things a little more difficult by making this type of hinge out of wood.

As shown in the Cutting Diagram, this box can be made from a piece of ¾"-thick scrap about 15" long. (The bottom is cut from a piece of ⅛" plywood.) The ¾" stock is first resawn on a band saw. I resawed and planed all pieces to 5/16" thick. The four sides are joined with rabbet/tongue joints, and a ⅛" x ⅛" groove is cut ⅛" from the bottom for the box's bottom. (See *Woodsmith* No. 6 for resawing and rabbet/tongue joint.)

The sides and bottom are assembled and allowed to dry. Then the top is rabbeted on all four sides to fit the inside dimensions of the box, and glued in place.

To form the lid, set the rip fence on a table saw ½" from the blade and simply rip down all four sides.

For the hinges, plane down a piece of scrap to ¼" thick. I found it easiest to make three such hinges, using one as a pattern. First drill the three ¼" holes in the hinge as shown in Detail A. The placement of the top two holes is not critical. But the bottom hole should be as close to the back edge as possible. (I placed the center of this hole ¼" from the back edge.)

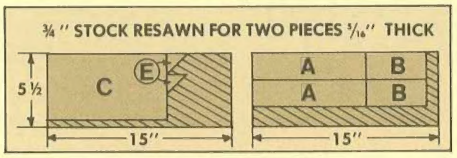
Drill these holes in the pattern hinge, then hold the pattern to the other hinges and duplicate the holes. Then hold the pattern to the box (with the lid clamped on) and drill the corresponding holes. (To prevent binding later, place two thicknesses of a 3x5 note card between the lid and the box.)

Three ¼" dowel pins are placed in the three holes in the box. The top two pins are glued in place, but the bottom pin is loose . . . *not* glued in. (This bottom pin must be free to turn in the hole.)

Before gluing on the hinge, place it on the pins and check the movement of the lid as it is lifted. You may have to chamfer the back edge of the box just slightly. When it checks out, apply glue to all three holes in the hinge and clamp it to the pins.

This box is made of Red Gum and finished with 1½ lb.-cut shellac polish.

CUTTING DIAGRAM



MATERIALS LIST

A	Front & Back	5/16 x 2 - 9
B	Sides	5/16 x 2 - 4¾
C	Top	5/16 x 5 - 9
D	Bottom	⅛ x 4½ - 8⅝
E	Hinges	¼ x 1½ - 1½

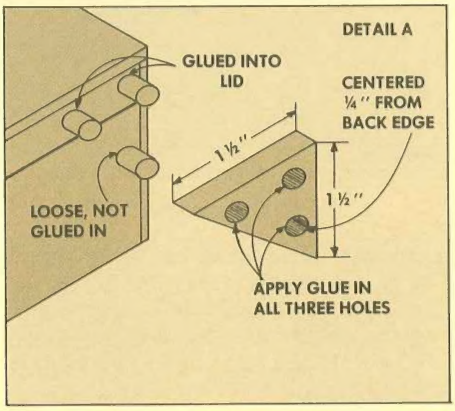
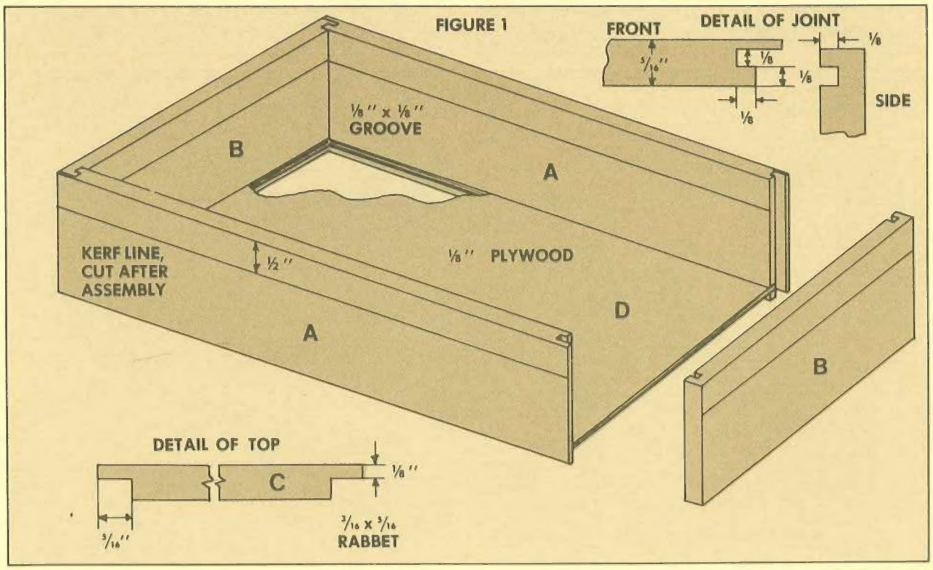
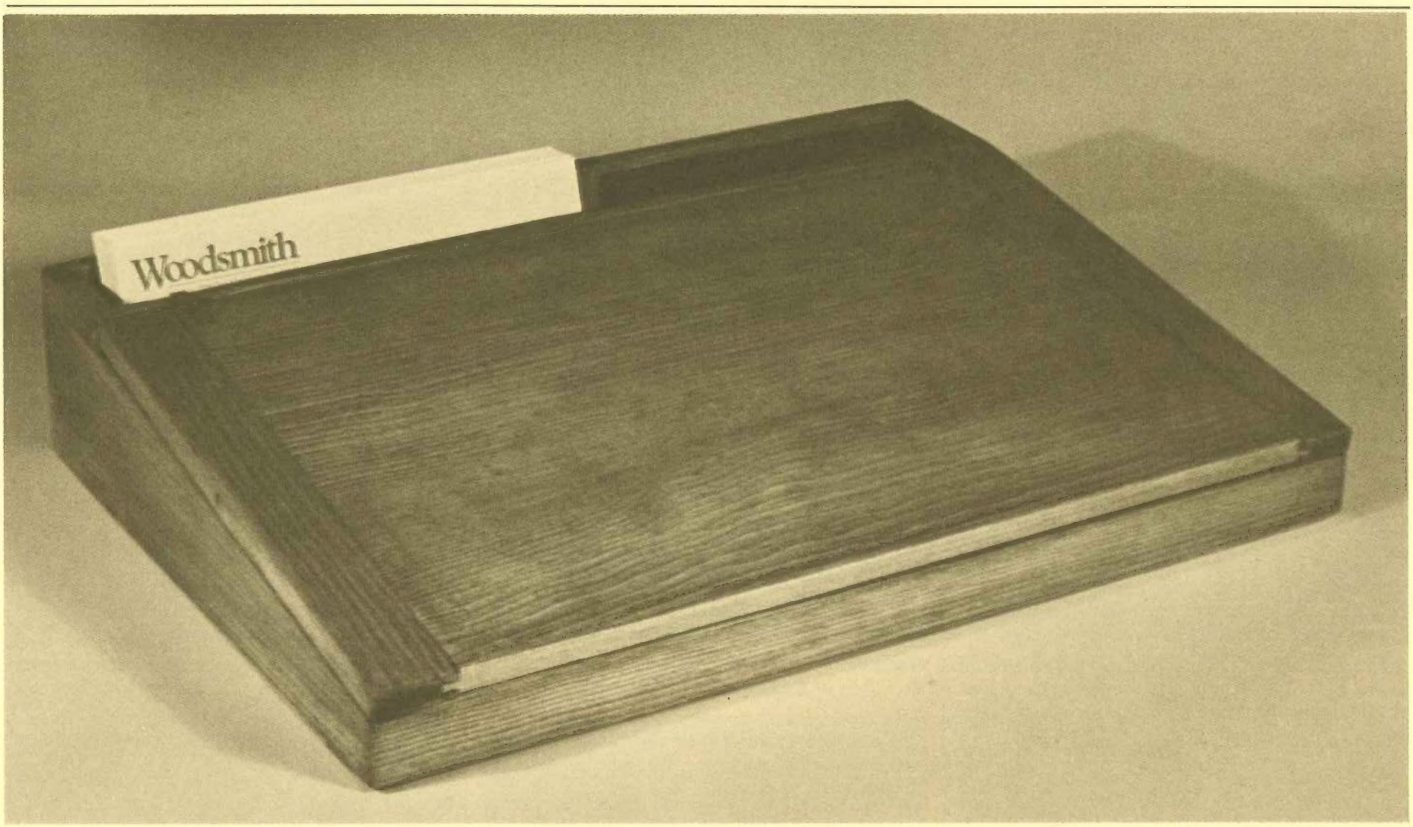


FIGURE 1



Lap Desk

A COLONIAL FAVORITE THAT HINGES ON WOOD



MATERIALS LIST

A	Side	½ x 3½ - 12¾
B	Front	½ x 1⁵⁄₁₆ - 17½
C	Divider	½ x 3¼ - 17
D	Back	½ x 3½ - 17½
E	Lid	½ x 3½ - 15
F	End Boards	½ x 1¼ - 10
G	Bottom	¼ x 12¼ - 17
H	Tray Dividers	½ x 1 - Opt.

CUTTING DIAGRAM

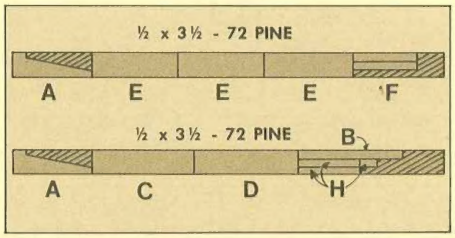
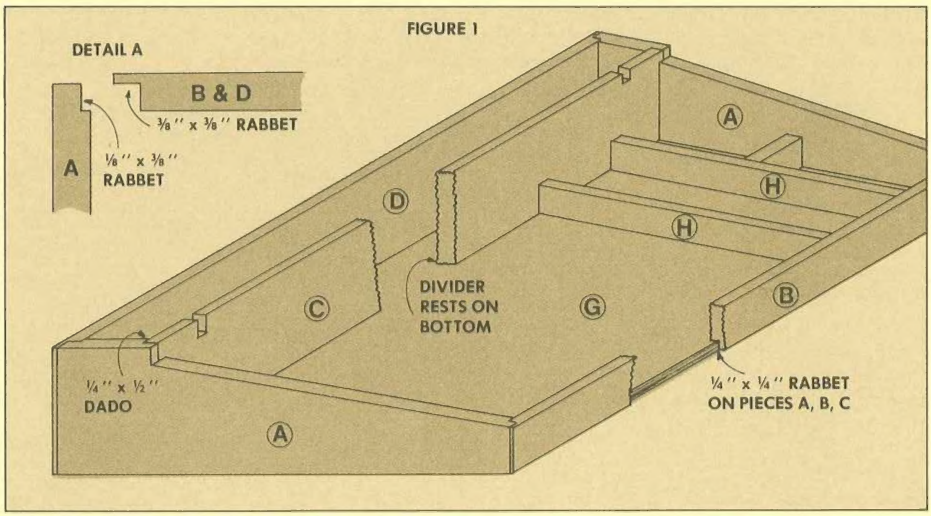


FIGURE 1



Every time I sat down to pay the monthly bills, I promised myself that someday I would build a lap desk. I used to sit on the couch and write out checks on a piece of scrap plywood.

I finally got around to building this lap desk and incorporated a small storage nest at the back for envelopes and my check book. Inside are compartments for stationery, pens, stamps, paper clips, etc. The only real difference between this lap desk and plans I've seen for others is that the top hinges on wood.

As shown in the Cutting Diagram, the pieces for this lap desk are cut from two pine boards ½" x 3½" - 72". I started by cutting the three pieces (E) for the lid and edge-glued them together. While the glue was drying, I went ahead on the base.

The base is fairly easy to construct. As shown in Figure 1, the sides are joined to the front and back with double rabbet joints. Detail A shows the dimensions of the rabbets, and Detail C shows the position of the dado for the divider.

Detail C also shows the dimensions of the 10° tapered section. I marked these dimensions on the wood and cut the taper on a band saw. The top edge of the front piece (B) is beveled at 10° to

End Boards

PROBLEM: WOOD MOVES

Look closely at the front right corner of the lap desk. See how the lid has contracted about 1/16" from the end of the end board? That's the problem with end boards (also called bread boards) . . . wood moves. It moves according to changes in humidity — expanding and contracting across its width a good deal more than along its length.

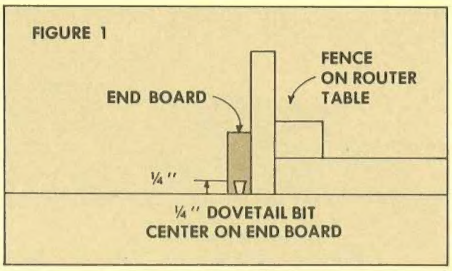
Changes in humidity may also cause the top to warp or cup. End boards help prevent this warping, as well as hide the end grain on the top.

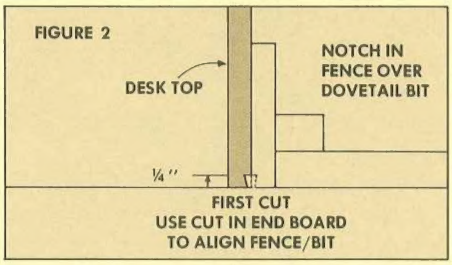
Mounting end boards so they can do their job means that you must allow for the movement of the wood. If the end board is glued over the entire width of the top, the natural movement of the wood is impaired, and no glue made can stop it. The wood will move one way or another. If it's impaired, the result is splitting.

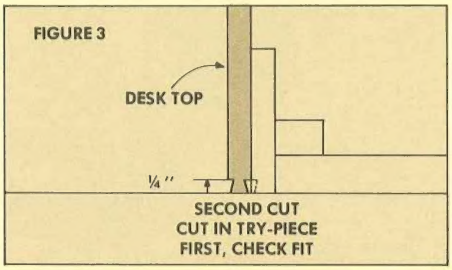
One solution that's nice on small tops like this lap desk is a dovetail groove and tongue. To cut this joint in the ½"-thick lid, I chose a ¼" dovetail bit mounted in a router table (see *Woodsmith* No. 5).

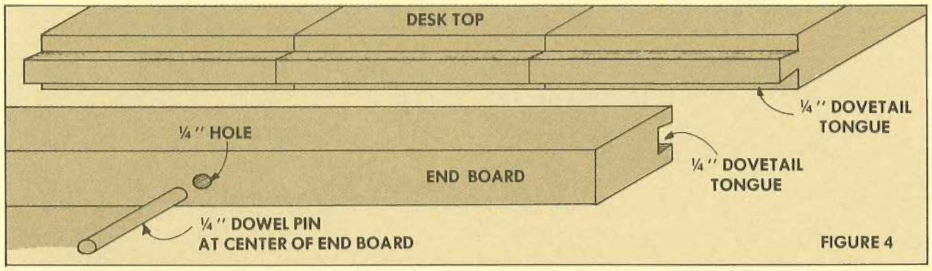
The first step is to cut the dovetail groove down the length of the end board, Fig. 1. To cut the dovetail tongue, make the first cut (Fig. 2) in the top, and in a try-piece. Make the second cut (Fig. 3) in the try-piece and check the fit. (I find it best to kind of sneak up on this cut — too wide at first, then trimming until it fits.)

The end board slides onto the top (no glue) and is fastened only at the center with a dowel pin. (This prevents it from sliding and "rocking.") The outside edges of the top are thus free to expand and contract without splitting the top.









continue the line of the sides.

All four outside pieces have a ¼" x ¼" rabbet around the bottom edge for the ¼" plywood bottom. The divider (C) is trimmed a ¼" narrow and rests on the bottom (G).

After the base is glued and clamped, the lid is cut to a 15" length. (The lid can be trimmed to width after the end boards are on.)

End boards (F) are fastened to the lid with a dovetail groove and tongue (see above). These end boards should be cut a little wider than necessary, say 1⅝" wide, and trimmed after the hinges are positioned.

Once the lid is assembled, the back edge (the edge against the divider) is beveled at 10°. Then two notches are cut in the lid for the hinges, Detail B. Place the lid on the base and extend the lines of the notches onto the divider (C). Use a coping saw to cut notches in the divider. (The bottom of this notch should slant 10° toward the front.)

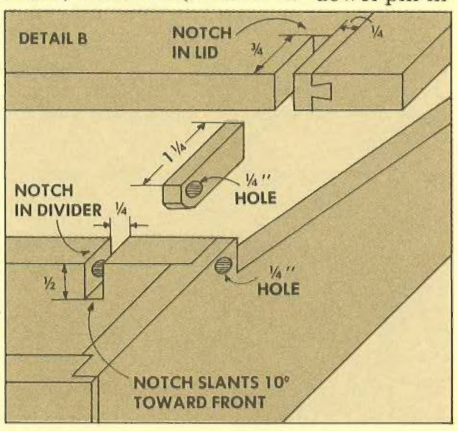
I cut the hinges from a scrap piece of maple. The *thickness* of the hinges is critical because they must fit very securely into the notch in the lid. The hinge's *width* should match the thickness of the lid, and it can be cut a little long initially and trimmed later.

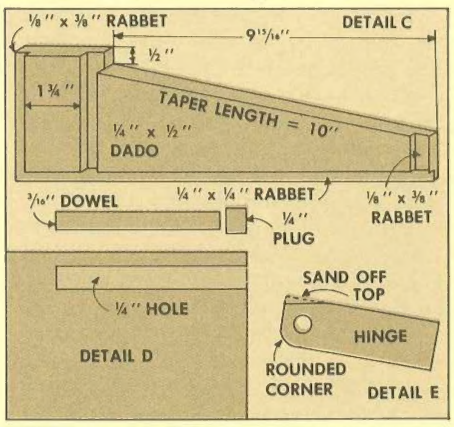
Glue the hinges into the notches in the lid. Then clamp the lid onto the base. Now comes the hard part. You must drill a ¼" hole through the side, into the divider, through the hinge, and a little beyond. The total depth of this hole is 2". (There's not much room to allow for a "wandering" bit, so raise it up out of the hole frequently to clear the shavings.)

Round over the back/bottom corner of the hinge so it clears the bottom of the notch, Detail E. (Place a 3/16" dowel pin in the hole and test the clearance.)

When it moves satisfactorily, cut the 3/16" dowel pin about ½" short of the depth of the hole, Detail D. Insert it and then glue a ¼" plug in the end of the hole, leaving a little clearance between the plug and the pin.

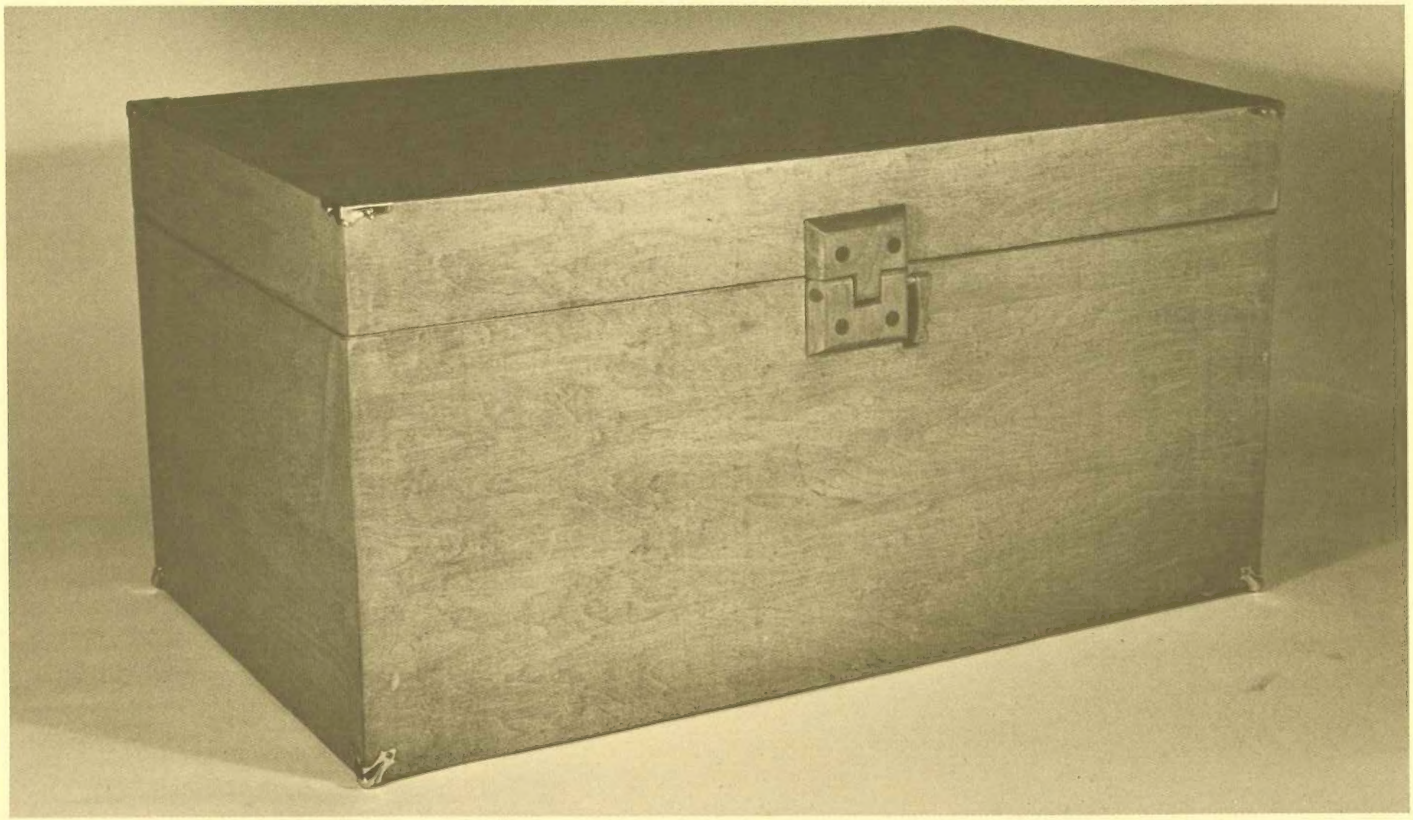
My lap desk is finished with *Minwax* Early American stain, and two coats of 1½" lb.-cut shellac. After applying the finish, the hinges on my desk swelled slightly. Now, whenever I open the lid, they creeaak, letting me know they are indeed wooden hinges.





Sweater Chest

A "SIMPLE" BOX WITH WOODEN HINGES



A "simple" box with wooden hinges. From the looks of this sweater chest the easy part would be constructing the box. But making wooden hinges sounds difficult. I found it was just the opposite. The reason: joinery. The basic box involves three joints: a locked miter, a parallel spline, and a rabbet and groove.

This sweater chest is made from ¾" maple veneer plywood (except for the bottom which is ½" Fir plywood). After cutting the front, back, and sides to size, I chose a locked miter to join them. (Details of this joint are on page 10.)

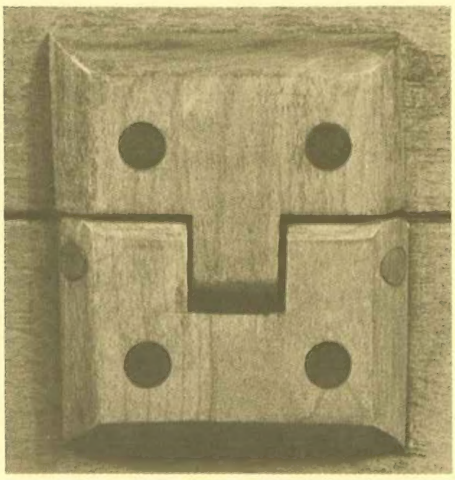
Then I gave myself a break and joined the bottom to the sides with a rabbet and groove joint (Detail in Fig. 1).

At this point the four sides and the bottom are glued and clamped together. Next, the top is added with a parallel spline joint. Thus, the box is constructed with no end grain showing.

To cut off the lid, I set the rip fence 3" from the blade and ripped down all four sides. (I started on one of the short ends so the last cut would be on a long side.)

Now for the fun part — making the wooden hinges. The dimensions of these hinges are shown in Figure 2. I started by ripping a piece of maple to 3" wide. Then I laid out the pattern for the two hinges and the latch (which is identical to the hinges), allowing ½" between each half of the hinge.

Next I marked the positions of the holes for the hinge pins on *both* edges of the board (top of Fig. 2). For the top part of the hinge I drilled a 5/16" hole to a depth of a little over 2" to make it through the "tongue." On the bottom part of the hinge I drilled each tongue separately — going in from each edge, and meeting in the middle.



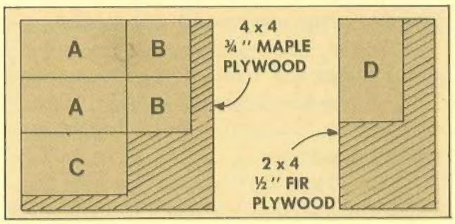
After the holes for the hinge pins were drilled, I bevel-ripped the sides of the board at 30°. Then each section was cut off at 30°. This provided a 30° bevel on three sides of the hinges as shown in Figure 2. Finally, I cut the hinges to shape on a band saw.

As shown in the end views of the hinge in Figure 2, the "tongues" on both halves must be rounded-over for clearance. Sand or file these tongues as shown. To check

MATERIALS LIST

A	Front & Back	¾ x 14 - 27
B	Sides	¾ x 14 - 16
C	Top	¾ x 16 - 27
D	Bottom	½ x 15¼ - 26¼

CUTTING DIAGRAM



Joinery: Parallel Spline

FITTING A TOP WITH NO END GRAIN SHOWING

Building a box isn't always as easy as it sounds . . . especially if you're working with plywood and trying to conceal the end grain. The problem with the sweater chest shown at left is joining the top to the sides — without the end grain showing.

One solution to this problem is the parallel spline joint. As shown in Figure 1, the spline, instead of being set at a right angle to the miter, runs parallel to the side of the box. This allows you to cut a miter on all four sides of the box and "drop" the top in place. Also, this joint need only be clamped in one direction (parallel to the spline).

The cuts themselves are not difficult. Accuracy is the key. Half of this joint must be cut *before* joining the sides, then the other half is cut *after* the box sides are glued up. This can create some real headaches if your first cuts are not dead accurate.

As shown in Figure 2, the top edges of the sides of the box are mitered at 45° and a groove is cut for the spline. (I use ⅛" birch plywood for the splines, and cut the grooves with an ⅛" dado blade.) The groove for the spline should be cut as close to the inside edge as possible. This allows for a maximum depth of cut on the top.

The sides of the box are then assembled and measurements can be taken for the top. Miter the edges on all four sides, but . . . before cutting the grooves in the top, miter a piece of scrap and cut a groove in it.

Set the scrap on a side (with the spline in place) and eyeball the fit. Apply downward pressure on the scrap, as if it were being clamped. The scrap will probably slide down into the box a little, so you'll have to adjust the placement of the groove (moving it closer to the inside edge) to allow for this. The edge of the top should meet exactly with the edge of the side (if all goes well).

FIGURE 1

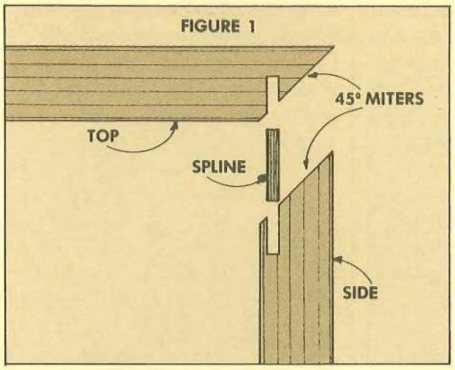


FIGURE 2

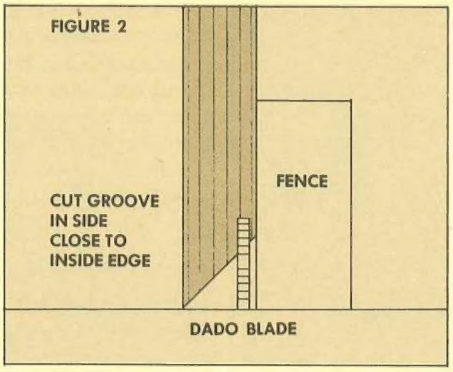
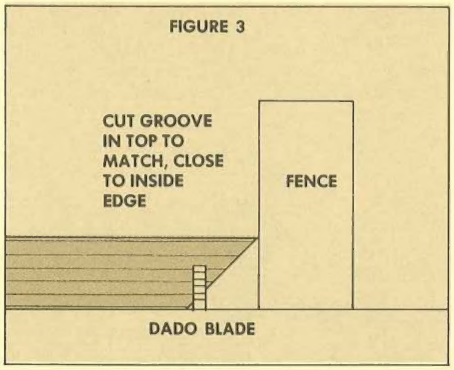


FIGURE 3



the clearance, insert a ¼" dowel pin in the hole. Lay the hinge on a flat surface and lift the top half. You should be able to see where it's binding (if at all).

Glue a 5/16" dowel plug in one side of the hinge, insert the ¼" dowel pin, and glue a second 5/16" plug on the other side. There . . . you have a wooden hinge. I then rounded over the 30° bevels on a belt sander.

Now it's just a matter of mounting the hinge to the box. I drilled two ⅜" counterbores in each half of the hinge, followed by a pilot hole for a No. 8-1" woodscrew. Fasten the bottom half first, then the top half, and finish by plugging the counterbores.

The latch on the front is exactly the same as the hinge . . . except a small tearshaped handle is carved and glued to the end of a hinge pin.

This chest is stained with *Minwax* Early American, finished with *Deft* Wood Armor, and *Stanley* Brass Corners.

FIGURE 1

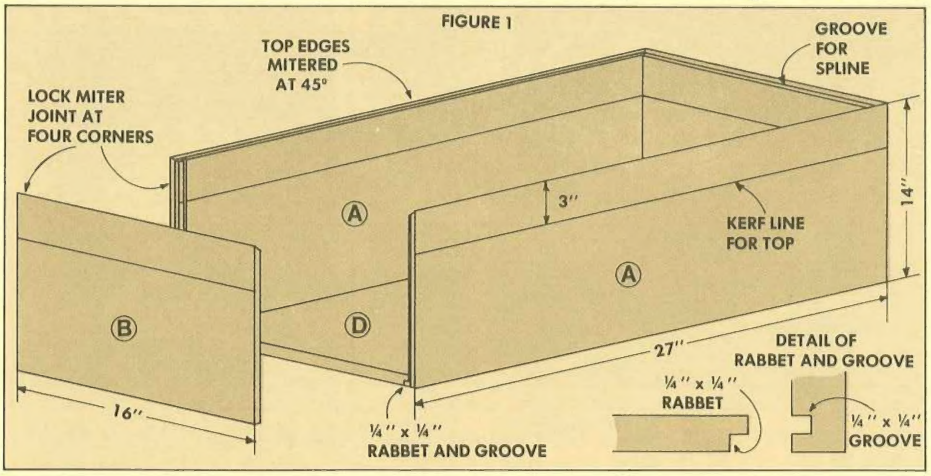
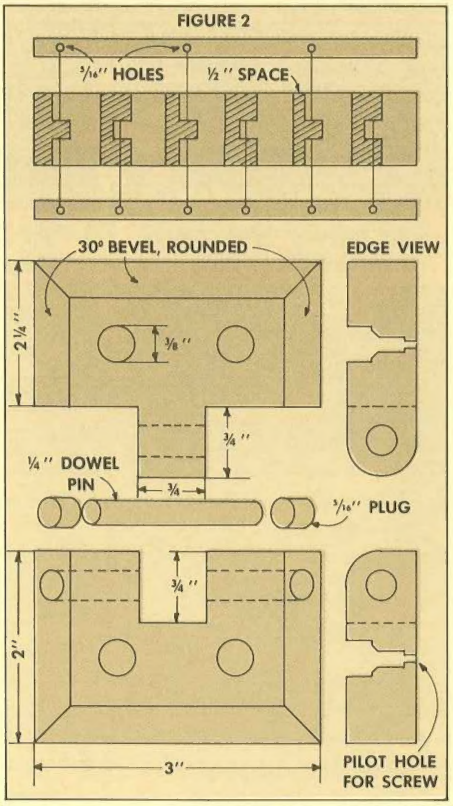
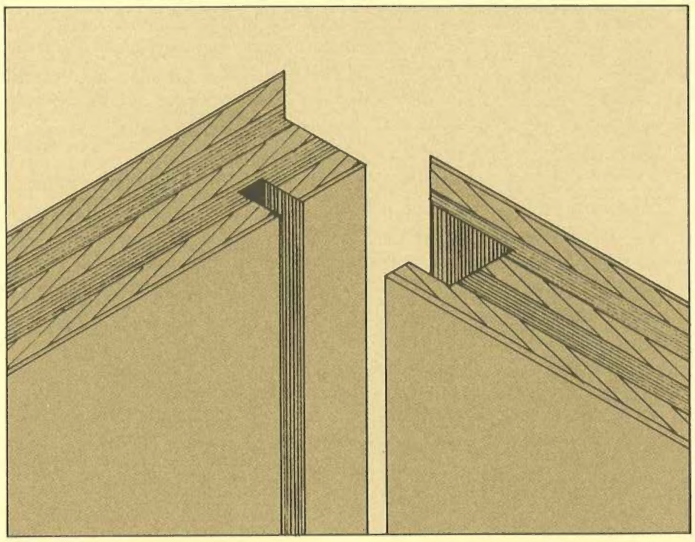


FIGURE 2



Joinery: Locked Miter

SIX CUTS TO A STRONG LOCKING JOINT



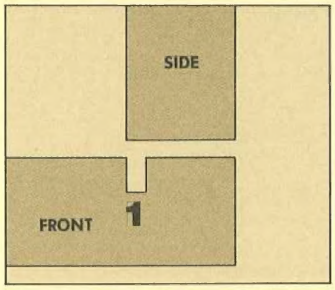
The locked miter is an excellent joint for use with hardwood plywood. It permits a clean, strong joint with no end grain showing. However, it is not recommended for use with solid wood — it chips apart too easily.

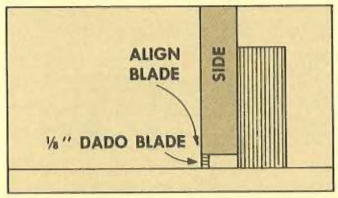
One advantage of this joint over a simple miter and spline joint is that it need be clamped in only one direction. (This feature is very handy in some applications.)

The six cuts (three on each piece) involved in cutting this joint are shown below. Each of these six cuts is based on one simple premise: Make a cut, then use that cut to gauge the next one.

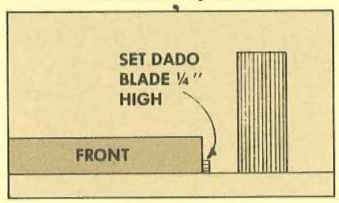
One note about the drawings: The view of the drawings for cuts 5 and 6 is from the front (of the table) if your arbor tilts to the left (*Craftsman*), or from the back if your arbor tilts to the right (*Rockwell*.)

One last note, the two pieces in the drawings are labeled "Front" and "Side". It really doesn't make any difference which piece is which — the only criterion is that the "Side" piece must be set on end (upright) for one cut. This is much easier on a short piece (which is usually the side piece).

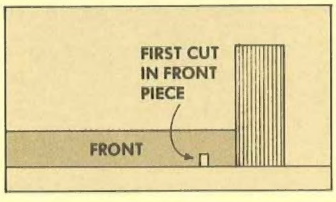




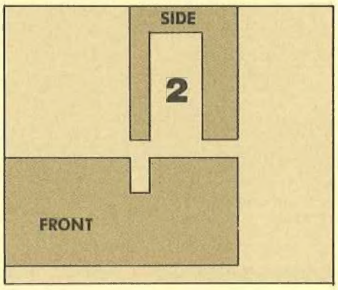
1. *Set fence so blade aligns with outside of* Side.

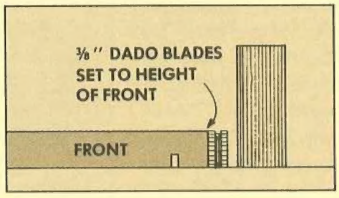


1. *Set height of blade for a ¼"-deep cut.*

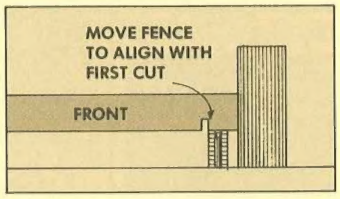


1. *Make first cut in* Front *with ⅛" dado blade.*

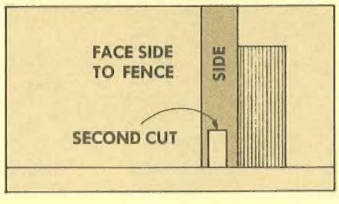




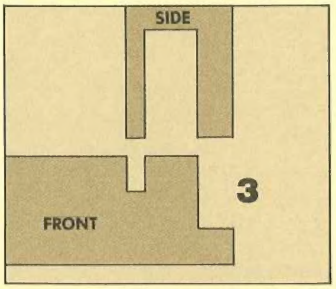
2. *Set height to thickness of* Front, *⅛"-wide cut.*

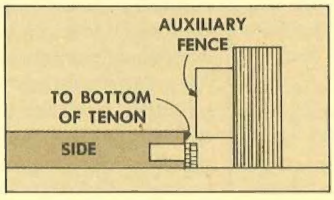


2. *Move fence to align with first cut in* Front.

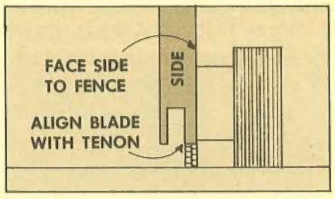


2. *Stand* Side *on end, face toward fence.*

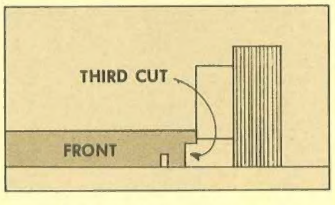




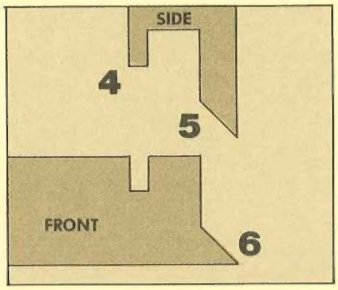
3. *Add auxiliary fence (1x2), set height for ¼"-wide cut.*

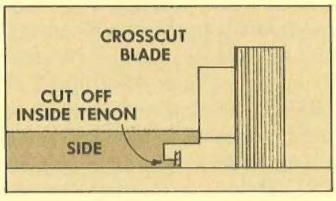


3. *Move fence to align with tenon on face of* Side.

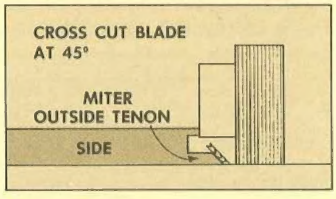


3. *Make third cut in* Front *with face side up.*

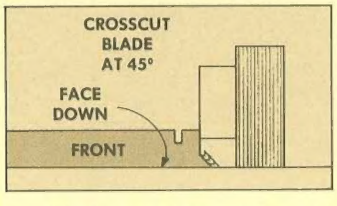




4. *Switch to crosscut blade, cut off inside tenon.*



5. *Set blade at 45° to miter outside tenon on* Side.



6. *Blade at 45°, move fence to cut miter on* Front.

Display Case

THE DOOR IS AN INTEGRAL PART OF THE HINGE

Some friends of mine asked me to build a display case for their spoon collection. At the time I was toying with the idea of incorporating a wooden hinge into the design of a door. This case offered the opportunity to try it out.

Since I wanted to have a glass door, I bought a piece of pre-cut glass and then built the case to fit the glass.

The door frame is joined with mortise and tenon joints (see *Woodsmith* No. 8), but not in the typical manner. Tenons are cut in the stiles so the rails can be extended to fit into the hinges.

After cutting the rails and stiles for the door, I dry-clamped them together and then built the case to fit the finished dimensions of the door.

As shown in Figure 1, the case is assembled with dado/tongue joints (see *Woodsmith* No. 6). The spoon "shelves" are set into stopped dadoes (chopped out with a bench chisel) and the case's back is set into a groove.

The fun part, of course, is making the hinge. As shown in Figure 3, the hinge is a variation on an open mortise and tenon joint. A ½"-wide by ¾"-deep mortise is cut in the ends of the door rails. Then a tenon is cut in the hinge to fit the mortise.

The hinge and the door rail are cut, filed, and sanded to fit each other, and then clamped together (with a *Jorgensen* hand screw) when drilling the holes. I drilled a ½" counterbore, 3/16" deep on both the top and bottom edge of the rail for the dowel plugs. Then I switched to a ⅜" bit and drilled through both the door rail and the hinge.

The trick with this hinge is to make the pin fit loosely in the hole — enough to permit it to swivel easily, but not so loose that the door sags.

Another problem is keeping the pin in place. This is solved by fitting a short hinge pin in the hinge and securing it with plugs above and below.

The back corner of the hinge tenon must be rounded to clear the bottom of the mortise in the door rail. And the back corners of the door rail must be rounded to clear the shoulders of the hinge.

After this is done, the door can be glued together. I cut a rabbet in the back of the door for the glass by using a rabbet bit in a router. This leaves rounded corners that must be chopped square with a bench chisel.

To fit the door to the hinge first glue a plug in the *bottom* counterbore of each door rail. Sand down a small section of ⅜" dowel so it fits loosely in the hole. Be sure to stand the case upright to check the amount of sag in the door. (A little bit of sag is unavoidable.) Then glue plugs in the top counterbores.

Since the hinge is made of wood, I also decided to make a wooden latch. This is just a thin piece of wood that hinges on a ¼" dowel with a ½" dowel cap. When I made these caps, I drilled a ¼" hole in the center of a ½" dowel first, and then cut off a small section for the cap.

This case is made of oak with ¼" oak plywood back, and finished with *Watco* Danish Oil.

MATERIALS LIST

A	Sides	¾ x 1¾ - 22
B	Top & Btm.	¾ x 1¾ - 15½
C	Spoon Shelf	¼ x 1¼ - 15
D	Door Rail	¾ x 1¼ - 16¾
E	Door Stile	¾ x 1¼ - 21½
F	Back	¼ x 15 - 21
G	Hinge	¾ x 1¼ - 2½
H	Glass	⅛ x 14 - 20

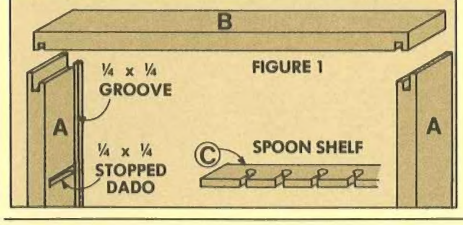


FIGURE 1

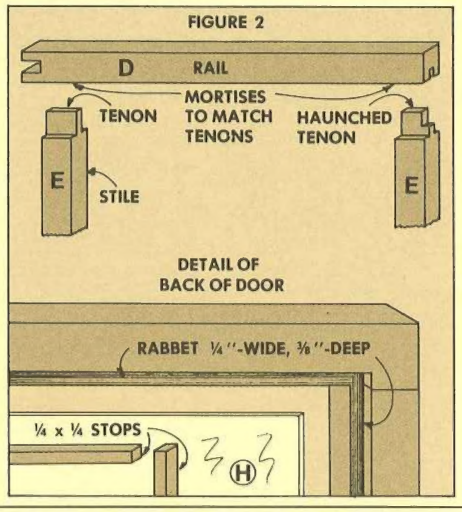


FIGURE 2

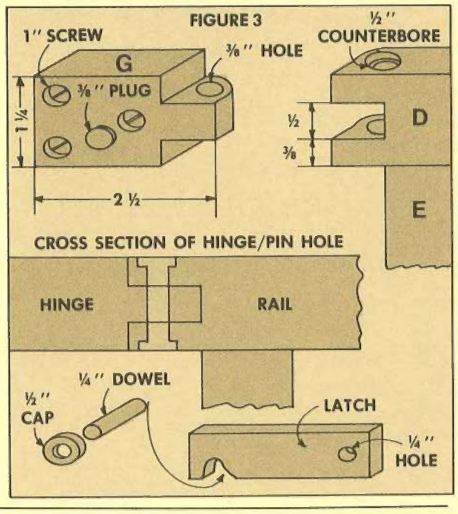


FIGURE 3

Tips & Techniques

A FEW TIPS FROM THIS ISSUE

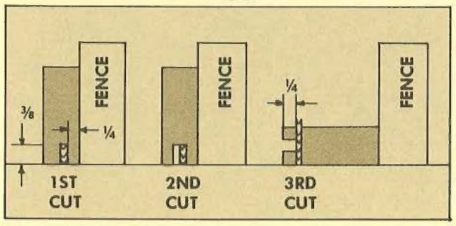
As I was working on the projects for this issue, I jotted down a few tips I thought might be helpful. Nothing here is earth-shattering, but these little tips might solve a problem or two.

CUTTING SMALL STRIPS

Very often the waste or "fall-off" from making a cut can be more interesting than the cut itself. That's the way I discovered an easy (and safer) way to cut very small strips of wood.

When I was making the display case shown on page 11, I needed some ¼" x ¼" stops to hold the glass in the back of the door.

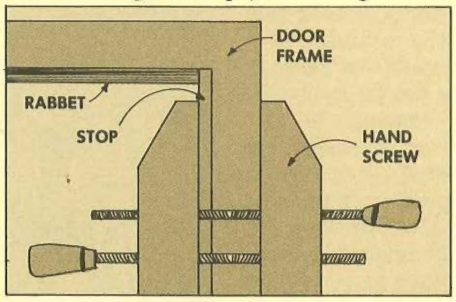
As shown in the drawing, I set the rip fence ¼" from the blade and set the depth of cut for about ⅜". Then I placed a board on edge and ran it along the fence for the first cut. I flipped the board end-for-end and made a second pass.



To get the ¼" x ¼" strips, I moved the fence to the right so there was a ¼" between the left edge of the board and the left side of the blade. Then I simply ripped off the strips — which were on the "waste" side of the cut.

CLAMPING STOPS

After cutting the stops, the next problem was fastening them in the rabbet to hold the glass in place. Usually these stops can be tacked in place with small brads. But since I was working with oak, I felt there was too great a risk of breaking the glass.



I decided to glue the stops in the rabbet. This was done by using a *Jorgensen* hand screw, set on its side. By selecting hand screws of various sizes (lengths) I was able to clamp the stops for their entire length.

SANDING DOWELS

I don't know how many times I've tried to fit a ¼" dowel in a ¼" hole, only to find the dowel is just a hair too big. Sanding a dowel down to the proper size can be a real pain.

One solution that works especially well with short lengths of dowel, is to chuck the dowel into the drill press. As the dowel is spinning, simply hold a sanding block up to it and sand it down to the desired diameter. It helps to stop the drill press occasionally, and slide the hole in the workpiece over the dowel to check the fit.

It's also very easy to blunt or taper the end of a dowel in this manner.